

# LESSON 17

LAB

## Technicolor Atoms Flame Tests

Name \_\_\_\_\_

Date \_\_\_\_\_ Period \_\_\_\_\_

### Purpose

To provide evidence for the presence of certain atoms within compounds.

### Materials

- 1 Bunsen burner
- 1 set of tongs
- 1 piece of copper wire
- 1 penny
- 11 pieces of nichrome wire with a loop
- 1 set of 11 solutions: sodium carbonate,  $\text{Na}_2\text{CO}_3$ ; potassium nitrate,  $\text{KNO}_3$ ; copper nitrate,  $\text{Cu}(\text{NO}_3)_2$ ; strontium nitrate,  $\text{Sr}(\text{NO}_3)_2$ ; potassium chloride,  $\text{KCl}$ ; sodium chloride,  $\text{NaCl}$ ; copper sulfate,  $\text{CuSO}_4$ ; strontium chloride,  $\text{SrCl}_2$ ; sodium nitrate,  $\text{NaNO}_3$ ; copper chloride,  $\text{CuCl}_2$ ; potassium sulfate,  $\text{K}_2\text{SO}_4$

### Safety Instructions



You will be working with flames and chemicals today.

Wear safety goggles.

Roll up long sleeves, tuck in loose clothing, and tie back long hair.

Know the location of the eye wash, fire blanket, and fire extinguisher.

### Procedure and Observations

Write your observations in a table like the one below.

1. For the solutions, follow these steps:
  - Place the looped end of the wire in the solution.
  - Hold the looped end in the flame.
  - Record the color of the flame.
  - Place the wire back in the correct solution.

*Note:* Do not exchange wires between solutions. After you use the nichrome wire, be sure to put it back in the solution it came from.

2. For the two solid copper objects, use tongs to hold each one in the flame and observe the results.

### Observations

Substance name	Formula	Flame color

### Observations

Substance Name	Formula	Flame Color
sodium carbonate		
potassium nitrate		
copper nitrate		
strontium nitrate		
potassium chloride		
sodium chloride		
copper sulfate		
strontium chloride		
sodium nitrate		
copper chloride		
potassium sulfate		

### Analysis

1. Group the substances based on the flame colors produced.

2. What patterns do you notice in the groupings?

3. Predict the flame color for a substance called strontium sulfate. Explain your reasoning.

4. What evidence do you have that atoms of certain elements produce a flame of a specific color?

5. **Making Sense** Can a flame test be used to identify a metal atom in a compound? Why or why not? What about a nonmetal atom?

6. **If You Finish Early** Copper oxide,  $\text{CuO}$ , is a black solid. It doesn't look at all like the element copper. What color flame would it produce? Draw a model of copper oxide to explain the flame color that you observe.

7. Describe what happens to  $e^-$  when a substance is vaporized in a flame. How can this phenomenon be used to ID an element?